

## CLAIMS

1. A polycarboxylic acid copolymer  
which is obtained by copolymerization of monomer  
5 components comprising a polyalkyleneimine unsaturated  
monomer (A1) and an unsaturated carboxylic acid monomer (B).

2. The polycarboxylic acid copolymer according to  
Claim 1,  
10 wherein said polyalkyleneimine unsaturated monomer  
(A1) has an oxyalkylene group.

3. A polycarboxylic acid copolymer  
which is obtained by copolymerization of monomer  
15 components comprising a polyalkylene glycol unsaturated  
monomer (A2) having a structure such that an oxyalkylene  
group is bound to a polyhydric alcohol residue, and an  
unsaturated monocarboxylic acid monomer (B').

20 4. A polycarboxylic acid copolymer  
which is obtained by copolymerization of monomer  
components comprising a hydroxyl-terminated, polyalkylene  
glycol unsaturated monomer (A2') having a structure such  
that an oxyalkylene group is bound to a polyhydric alcohol  
25 residue, and an unsaturated carboxylic acid monomer (B).

5. The polycarboxylic acid copolymer according to  
Claim 1,  
wherein said monomer components comprise a  
30 polyalkylene glycol unsaturated monomer (A3) other than  
said monomer having an oxyalkylene group.

6. The polycarboxylic acid copolymer according to  
Claim 3,  
35 wherein said monomer components comprise a

polyalkylene glycol unsaturated monomer (A3) other than said monomer having an oxyalkylene group.

7. The polycarboxylic acid copolymer according to  
5 Claim 4,

wherein said monomer components comprise a polyalkylene glycol unsaturated monomer (A3) other than said monomer having an oxyalkylene group.

10 8. A method of producing a polycarboxylic acid copolymer

which comprises copolymerizing monomer components comprising a monomer (A) having an oxyalkylene group and an unsaturated carboxylic acid monomer (B) using a hydrophobic  
15 chain transfer agent.

9. The method of producing a polycarboxylic acid copolymer according to Claim 8,

20 wherein said hydrophobic chain transfer agent comprises a thiol chain transfer agent having a hydrocarbon group containing not less than 3 carbon atoms.

10. A polycarboxylic acid copolymer  
which is obtained by the method of producing a  
25 polycarboxylic acid copolymer according to Claim 8.

11. A cement additive  
which comprises the polycarboxylic acid copolymer  
according to Claim 1.  
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12. A cement additive  
which comprises the polycarboxylic acid copolymer  
according to Claim 3.

35 13. A cement additive

which comprises the polycarboxylic acid copolymer according to Claim 4.

14. A cement additive

5 which comprises the polycarboxylic acid copolymer according to Claim 10.

15. A cement additive

10 which has a calcium transfer value of 10 to 900 mPa·s and/or a cement performance coefficient of 0.05 to 1.0.

16. A cement additive

15 which has, when purified following adjustment to pH 12 to 12.5, a nitrogen content of 0.1 to 20% by weight as determined by elemental analysis,

allows detection of morpholine, 4-(2-hydroxyethyl)morpholine and 1,4-dioxane upon pyrolysis GC-MASS,

20 shows a peak having no shoulder in GPC, has a weight average molecular weight (Mw) of 5,000 to 300,000,

shows, in IR measurement, an absorption peak at 1640 to 1660  $\text{cm}^{-1}$  whose intensity is not more than 20% of the intensity of the absorption peak occurring at 1710 to 1630  $\text{cm}^{-1}$ ,

25 allows detection, in  $^{13}\text{C}$ -NMR, of signals at chemical shift positions of 60 to 61 ppm and 69 to 68 ppm, has an NMR-PEG content of 10 to 99% by weight and has a TCAV of 3 to 900 mg KOH/g.

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17. A cement composition

which comprises at least water, cement and a cement additive,

35 the cement additive according to Claim 11 being used as said cement additive.

